

Appendix A – Workshop Agenda

US EPA Workshop on Managing Arsenic Risks to the Environment: Characterization of Waste, Chemistry, and Treatment and Disposal

WORKSHOP GOALS

The goals of the workshop are: (1) to examine the chemical fundamentals related to arsenic chemistry, speciation, and analytical issues, (2) to examine the state of practice of existing and emerging technologies that treat and properly dispose of arsenic wastes, and (3) to identify/characterize sources of arsenic.

TUESDAY, MAY 1 – PLENARY SESSION

Capitol Rooms

8:45 AM	Welcome Remarks, <i>Max Dodson, US EPA Region 8</i>
8:55 AM	Opening Remarks, <i>Doug Grosse, US EPA, National Risk Management Research Laboratory (NRMRL)</i>
9:05 AM	ORD Perspective, <i>Paul Randall, US EPA, National Risk Management Research Laboratory (NRMRL)</i>
9:30 AM	Hazardous Waste Treatment/Regulatory Issues, <i>Jim Berlow, USEPA, Office of Solid Waste (OSW)</i>
9:55 AM	Break
10:10 AM	Arsenic Cycling in the Mining Environment, <i>Rob Bowell, SRK Consulting</i>
10:35 AM	Arsenic in Groundwaters of the United States, <i>Dennis Helsel, U.S. Geological Survey</i>
11:00 AM	Managing Arsenic Occurrence Information in Drinking Water, <i>Larry Scanlan, Utah Department of Health</i>
11:30 AM	Lunch
1:00 PM	TRI: What It Is. Where to Find It. And How to Use It., <i>Joyel Dhieux, US EPA, Region 8</i>
1:25 PM	Arsenic Hazardous and Remediation Waste: Sources and Treatment, <i>Linda Fiedler, US EPA, Technology Innovation Office (TIO)</i>
1:50 PM	Treatment Options for Arsenic Wastes, <i>Godage Wickramanayake, Battelle Memorial Institute</i>
2:15 PM	Some Chemical Aspects Relating to Arsenic Remedial Technologies, <i>Robert Robins, AquaMin Science Consortium International</i>
2:40 PM	Break
3:00 PM	Arsenic Geochemistry: An Overview of an Underhanded Element, <i>Kirk Nordstrom, U.S. Geological Survey</i>

TUESDAY, MAY 1 – PLENARY SESSION

Capitol Rooms

(Continued)

3:25 PM	Impact of Microbial Activity on Arsenic Geochemistry, <i>Dianne Ahmann, Colorado School of Mines</i>
3:50 PM	A Framework for Assessing Arsenic Leaching from Soils and Water, <i>David Kosson, Vanderbilt University</i>
4:30 PM	Q & A
5:00 PM	Adjourn

WEDNESDAY, MAY 2 – CONCURRENT BREAKOUT SESSIONS

8:00 AM	Concurrent Breakout Sessions
10:00 AM	Break
10:30 AM	Concurrent Breakout Sessions
Noon	Lunch
1:30 PM	Concurrent Breakout Sessions
3:00 PM	Break
3:30 PM	Concurrent Breakout Sessions
5:00 PM	Adjourn
7:30 - 9:00 PM	Meeting to plan Day 3 Reports

BREAKOUT SESSION SPEAKERS AND PARTICIPANTS

Source Identification Breakout Session

Capitol Room 2

Co-Chairs

Diana Bless, US EPA NRMRL

Doug Grosse, US EPA NRMRL

Carol Russell, US EPA Region VIII

Speakers

Scott Warner, Geomatrix Consultants, Inc.	Distinguishing Natural and Anthropogenic Sources of Arsenic: Implications for Site Characterization
Richard Glanzman, CH2M Hill	Arsenic Background and Associated Elements Controlling Mobility
Tracy Connell Hancock, USGS	Reconnaissance for Arsenic in a Poultry Dominated Chesapeake Bay Watershed – Examination of Source, Transport and Fate
Roger Olsen, Camp Dresser & McKee, Inc.	Characterization of the Forms of Arsenic in Soil/ Sediments to Evaluate Mobility and Treatment
Andy Davis, Geomega, Inc.	Iron Amendments as Adjuncts to Constrain Arsenic Solubility in a Marsh Environment
Martin Goldhaber, USGS	Potential Environmental Consequences of Localized Arsenic Enrichment in Appalachian Basin Coals
John Pantano, ARCO Env. Remediation	Arsenic Concentrations in Water at Mining Sites
Stephen Schoen, Placer Dome America and Glenn Eurick, Barrick Management Corporation	Arsenic and TRI in Select Nevada Gold Production Operations

Participants

Jim Berlow, US EPA OSW

Robert Bowell, SRK Consulting

Joyel Dhieux, US EPA Region VIII

Tim Eastep, Phelps Dodge Corporation

Barbara O'Grady, Colorado Department of Public Health and Environment

Jeff Parshley, SRK Consulting

Treatment and Disposal

Capitol Room 3

Co-Chairs

Paul Randall, US EPA NRMRL
Robert Robins, AquaMin Science Consortium International
Chris Impellitteri, US EPA NRMRL

Speakers

Peter Shields, Tetra Tech EMI	Treatment Technologies for Wastes and Environmental Media Containing Arsenic
Neill Thompson, Government of Canada	Treatment Options for Arsenic Trioxide Bearing Dust at the Giant Mine, Yellowknife, Northwest Territories, Canada
Jay McCloskey, MSE Inc.	Removing Arsenic for Mining Industry Waters, Treatability Studies, EPA Mine Waste Program
Rong-Yu Wan, Newmont Mining Corporation	Characterization of Arsenic in Refractory Gold Ores Roasting - Cyandation Processing
Lena Ma, University of Florida	Phytoremediation of Arsenic Contaminated Sites Using Brake Fern Hyperaccumulator
James Redwine, Southern Company Services, Inc.	In-Situ Chemical Fixation for Arsenic Remediation and Arsenic Mobility Studies
Richard Markey, Southern Company Gulf Power Company	Arsenic Contamination in Soil and Groundwater: Review of - Remediation Methods
Michael Leist, Varian Inc.	The Cement Stabilization and Leaching of Arsenic
Irene Legiec, DuPont	Characterization and Treatment of Arsenic Contaminated Soils: The Dupont Experience
Jeri Sullivan, Los Alamos National Laboratory	Sorption of Arsenic from Soil-Washing Leachate by Surfactant-Modified Zeolite
James Navratil, Clemson University	Adsorption and Nanoscale Magnetic Separation of Heavy Metals from Water

Participants

John Austin, US EPA OSW
Ed Bates, US EPA NRMRL
Eric Bock, U.S. Ecology of Idaho
John Burckle, Burckle Consulting
Jim Dunn, US EPA
Peggy Groeber, SAIC
Linda Fiedler, US EPA TIO
David Kosson, Vanderbilt University
Juan Parra, US EPA OSW
Florence Sanchez, Vanderbilt University
Larry Scanlan, Utah Department of Health
Godage Wickramanayake, Battelle Memorial Institute

Arsenic Chemistry

Capitol Room 4

Co-Chairs

Robert Ford, US EPA NRMRL

Kirk Nordstrom, USGS

Speakers

Harry Hemond, Massachusetts Institute of Technology	Interactions of Arsenic Speciation with the Nitrogen Cycle
Spencer Porter, US EPA ORD	Arsenic Immobilization: Thermochemical Analyses
William Cullen, University of British Columbia	Arsenic in Yellowknife, Canada
Dirk Wallschlaeger, Frontier Geosciences, Inc.	Measuring Arsenic Speciation in Waters - Choosing the Right Analytical Technique for Your Geochemical Problem
Robert Ford, US EPA NRMRL	Approaches to Characterizing Solid Phase Arsenic Speciation
Barton Simmons, California Department of Toxic Substances Control	Comparative Extractions of Arsenic Containing Wastes for Waste Classification
Florence Sanchez, Vanderbilt University	Protocols for Estimating Arsenic Leaching from Soils and Solidified Waste
Jim V. Rouse, Montgomery Watson	Alternative Methods to Assessing Leach Potential

Participants

Dianne Ahmann, Colorado School of Mines

Souhail Al-Abed, US EPA NRMRL

Willard Chappell, University of Colorado at Denver

Kyle Cook, SAIC

Jack Creed, U.S. EPA ORD

Kevin H. Gardner, University of New Hampshire

Sabine Goldberg, USDA-ARS

Ed Herthmar, U.S. EPA

Ralph Ludwig, US EPA NRMRL

Gregory Miller, Geochemical, Inc.

Larry Rosengrant, US EPA OSW

Rick Sanzolone, USGS

Kathleen Smith, USGS

THURSDAY, MAY 3 – BREAKOUT SESSION REPORTS – SINGLE SESSION

8:30 AM	Source Identification
9:15 AM	Arsenic Chemistry
10:00 AM	Break
10:30 AM	Treatment and Disposal
11:15 AM	Q & A
Noon	Closing Remarks
12:15 PM	Adjourn

QUESTIONS FOR BREAKOUT GROUPS

Source Identification

1. What are the primary waste forms that contribute to Arsenic contamination?
2. What are the major problems encountered with characterization of Arsenic impacted media or sources?
3. What significant data gaps and information needs exist for characterizing and identifying Arsenic sources and waste forms?
4. What are the two or three important insights to be conveyed regarding the management of Arsenic risks from industry?

Treatment and Disposal

1. What are the long term stability issues with regard to land disposing (i.e., on-site storage or landfills) arsenic stabilized wastes?
2. How do current advances (i.e., molecular chemistry, leaching mechanisms) impact the areas of arsenic treatment and disposal?
3. What are the top five research needs in arsenic treatment and disposal?

Arsenic Chemistry

1. Is our knowledge of arsenic speciation and transformation adequate to identify pathways and routes of mobility?
2. Are current collection, preservation, and analytical techniques sufficient for defining arsenic chemistry in natural and engineered systems?
3. Are existing leaching procedures adequate for characterization of arsenic-bearing waste materials?